One Decade Down: Impact of Substance Prevention after the Principles of Effectiveness

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Abstract

Substance prevention programs proliferate throughout America's Schools. Since 1998, the US Department of Education (US DOE) has required that school-based programs funded with federal subsidies be subject to a four stage process to insure effectiveness. The current study applies multivariate OLS techniques to data from a nationally representative probability sample of 16,001 youths aged $12 - 17$ to examine whether attendance to in-school primary prevention programs for substance use reduces tobacco, alcohol and marijuana use. The results indicate significant, but irrelevant reductions in the use of tobacco ($r^2 = 0.54$), alcohol ($r^2 = .044$) and marijuana $r^2 = .030$). Recommendations are made for review of school-based substance prevention programs to insure compliance to the US DOE guidelines, to terminate funding for programs that are not effective and for directions in future research.

Federal funds have two inherently paradoxical characteristics: they are perpetual and limited. On one hand, funds are seemingly always available to implement social programs that are meant to benefit the greater good, and in large amounts. On the other, this money originates from the individual taxpayer and policy generally holds that there be measures of accountability to the purse-holders for decisions as to where and how funds are allocated. Ideally, expenditures are celebrated when the greater good is served and slashed if they do not make the promised contribution.

Based on this premise, on July 1, 1998, the US Department of Education initiated the Principles of Effectiveness for school-based substance and violence prevention programs (DOE, 1998). At heart, this mandate requires that all schools receiving federal funding under the Safe and Drug-Free Schools and Communities Act of 1994 (*et. seq*.) implement programs to prevent use, possession and distribution of tobacco, alcohol and illegal drugs (DOE, 1998; Improving America's Schools," 1994; No Child Left Behind," 2002; Simons-Rudolph, et al., 2003). While leaving individual schools with discretion in choosing these programs, the Department of Education requires that programs be selected only after a strong local needs assessment, that they have well defined, objective and measurable outcomes and that they be based on research and evidence of success (DOE, 1998; Simons-Rudolph, et al., 2003). Further, any implemented programs are subject to periodic review (Simons-Rudolph, et al., 2003).

The current study examines the state of attaining the first goal of in-school primary prevention programs under the Principles of Effectiveness- that of reducing the *use* of tobacco, alcohol and marijuana- a full decade after implementation.

Review of the Literature

Beginning with the Drug Free Schools and Communities Act of 1986, there has been strong interest and financial support for reducing the use of substances by America's youth through in-school prevention programs. Probably the best known, and most well studied, of these programs is the Drug Abuse Resistance through Education (DARE) program (Ennett, Tobler, Ringwalt, & Flewelling, 1994; Midford, 2006). This program is facilitated by a specially trained local police officer in the classroom setting and includes lessons on drugs, self-esteem, decision making and healthy alternatives to substances (Ennett, et al., 1994). Ennett and colleagues (1994) completed a meta-analysis of all published and unpublished reviews of the DARE program over the course of a decade and determined that its effects on drug use are not significant. Despite consistently non-significant results, DARE remains in use in more than 80% of America's schools (Midford, 2006).

The lack of success shown with DARE has led to the development of programs with new curricula aimed at reducing substance use. Given that schools have to incorporate programming for a broad continuum of student abilities (Hopson & Steiker, 2008), these new programs have been developed for alternative school students (Dent, et al., 1998; Hopson & Steiker, 2008), have modified who leads the groups- peers or adults- (Erhard, 1999) and have attempted to individualize the programs per school (Hopson & Steiker, 2008; Sack, 1997; Scott, 1996). Despite these efforts, a five year, US Department of Education sponsored study of national school-based drug prevention programs found, overall, they were not meeting the goal of preventing youth substance use (Sack, 1997). The average appropriation to these programs is $10 per student (Sack, 1997), with 97% of schools receiving Safe and Drug Free Schools and Communities Act funds from the federal government (Simons-Rudolph, et al., 2003).

Knowledge of such profound failures has given rise to a need for accountability and oversight into the spending of Safe and Drug-Free Schools and Communities Act money, beginning with the Principles of Effectiveness (DOE, 1998). These guidelines require that schools undergo a four-stage process when implementing substance and violence prevention programs. The first step is to conduct a thorough local needs assessment; the second is to develop measurable goals for these programs to reach; the third step is to choose and implement research-based programs; and the final step is to subject the programs to periodic review for success.

Simons-Rudolph and colleagues (2003) conducted a first-year review to determine if and how schools were incorporating the Principles of Effectiveness into substance prevention programming. Their findings indicated that the most common Principle planned for incorporation was a needs assessment, while the least planned was to incorporate research-based programming. Only 17% of the nationally representative sample planned to incorporate all four principles (Simons-Rudolph, et al., 2003). These results are disappointing. As Hopson and Steiker (2008) note, "interventions cannot flourish without participation and commitment on the part of the host environment (p125)."

Lack of commitment to quality substance prevention programming, theoretically, leads kids to use more substances. If kids do not refrain from substance use, tax dollars are misspent. Knowing how the Principles of Effectiveness have impacted these two factors over the past decade is important to continued prevention efforts.

Present Study

The present study examines the relationships between attending primary prevention programs for substance use and/or violence and self-reported substance use. Primary prevention

programs, also referred to as universal prevention programs, are those designed to reach a

general audience prior to involvement in or manifestation of behavior considered problematic

(Feldman, 2008; King, 2008). For purposes here, these are any programs instituted to the general

school audience for the prevention of substance use. Although there is argument that such

programs should target alternative school youth (Hopson & Steiker, 2008), such distinction is

beyond the scope of the present paper.

Through secondary analysis of data from the 2008 National Survey on Drug Use and

Health, multivariate Ordinary Least Squares (OLS) regression techniques will assess the

relationship between attending primary prevention programs both in- and out- of school at any

point in the 12 months prior to survey administration and self-reported substance use in the 30

day period prior to survey administration. Following the criteria of the Principles of

Effectiveness, use of tobacco, alcohol and marijuana will be examined.

Hypotheses

As the Principles of Effectiveness were designed and implemented to decrease youth

substance use, the research hypotheses tested herein are:

H1:   Attending a school-based primary prevention program will reduce self-reported

tobacco use.

H2:   Attending a school-based primary prevention program will reduce self-reported

alcohol use.

H3:   Attending a school-based primary prevention program will reduce self-reported

marijuana use.

Sample

The data for the study originate from the 2008 National Survey on Drug Use and Health (NSDUH), conducted by the US Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA) Office of Applied Studies. The NSDUH is an annual survey of those aged 12 and older, primarily concerned with the prevalence, prediction and correlates of drug use in the United States. The sampling technique is a multi-stage area probability sample from the population of all 50 states and the District of Columbia, overall N= 68,736 respondents. Beginning in 2002, participants are paid $30 for completion of the survey. Overall response rate for the NSDUH is 74.4% for the interviews. Data are collected using audio computer assisted self-interview, computer assisted personal interview and computer assisted self-interview. For certain missing variables, statistical imputation is conducted to improve estimation accuracy.

Although the sampling procedures allow for sampling of all those aged 12 and older, there is a special section of the survey targeted to respondents aged 12-17 years old. Referred to as "Youth Experiences," this section includes questions on a variety of topics including exposure to substance abuse prevention and education programs, drug use by friends and self-reported substance use. Data for the current study are drawn from those answering the question items in this sub-portion (n=16,001). Males account for 8,225 respondents (51.4%) in the sample; the modal age is 16 years old (18.8%); modal grade for respondents is 10th grade (18.0%); and most respondents are white (60.4%). Table 1 offers a full tabular representation of the demographics of the sample.

TABLE 1: Descriptive Statistics

	N = 16,001		
Sex:			
	Male:	n = 8225	51.4%
	Female:	n = 7776	48.6%
Age:	(Range 12 to 17 years old, mean 14.67 years, median 15, mode 16, sd 1.67 year)		
	12 years old	n = 2166	13.5%
	13 years old	n = 2442	15.3%
	14 years old	n = 2622	16.4%
	15 years old	n = 2873	18.0%
	16 years old	n = 3016	18.8%
	17 years old	n = 2882	18.0%
Grade[1]:	(Range 5th and less to 2nd – 3rd year of college, mode 10th grade)		
	5th grade or less n = 56		.3%
	6th grade	n = 755	4.7%
	7th grade	n = 2191	13.7%
	8th grade	n = 2527	15.8%
	9th grade	n = 2792	17.4%
	10th grade	n = 2884	18.0%
	11th grade	n = 2820	17.6%
	12th grade	n = 1644	10.3%
	1st year college n = 127		.8%
	2nd / 3rd year college	n = 3	.0%
Race:			
	White	n = 9660	60.4%
	Black	n = 2176	13.6%
	Other	n = 4165	26.0%

1- Grade was removed from the final analysis due to high collinearity with Age, and several attributes falling below 15% of the sample.

Dependent Variables

Dependent variables (DV) for this study are self-reported tobacco use, self-reported alcohol use and self-reported marijuana / hashish use, all as reported by the respondents for the 30-day period prior to and including the date of survey administration. All dependent variables are continuous, can be considered unbounded and are numerical.

Self-reported tobacco use (tob30days) is an aggregation of the total number of days respondents reported tobacco use including cigarettes, snuff, chewing tobacco, pipe tobacco and cigars, in the 30 days prior to and including the date of survey administration. Such aggregation resulted in a range from 0 to 105 total days of use (mean 2.0, s.d. 7.589). A result greater than 30

indicates that the respondent reported use of more than one type of tobacco, while a result less

than or equal to 30 may include any one or combination of the types of tobacco used.

TABLE 2: Dependent Variables

		N = 16001			
Lifetime Tobacco Use (ever):					
Cigarette:					
	No:	n = 12029	75.2%		
	Yes:	n = 3972	24.8%		
Snuff:					
	No:	n = 14922	93.3%		
	Yes:	n = 1072	6.7%		
Chew:					
	No:	n = 15262	95.4%		
	Yes:	n = 737	4.6%		
Cigar:					
	No:	n = 43814	86.3%		
	Yes:	n = 2183	13.6%		
Pipe:					
	No:	n = 15599	97.5%		
	Yes:	n = 401	2.5%		
Aggregate:					
	No:	n = 11291	70.6%		
	Yes:	n = 4710	29.4%		
Tobacco Use Reported Last 30 Days:					
Range (# days in last 30):		0 – 105	Mean = 2	Mode = 0	sd = 7.589
Alcohol Use Lifetime (ever):					
	No:	n = 9455	59.1%		
	Yes:	n = 6538	40.9%		
Alcohol Use Reported Last 30 Days:					
Range (# days in last 30):		0 – 30	Mean = .6778	Mode = 0	sd = 2.434
Marijuana / Hashish Use Lifetime (ever):					
	No:	n = 13124	82.0%		
	Yes:	n = 2870	17.9%		
Marijuana / Hashish Use Last 30 Days:					
Range (# days in last 30):		0 – 30	Mean = .7842	Mode = 0	sd = 3.930

Sd- standard deviation

Self-reported alcohol use (range 0-30, mean .6778, s.d. 2.43) was measured as

consumption of one or more drinks of an alcoholic beverage, with alcoholic beverage defined as

"a can or bottle of beer, a glass of wine or a wine cooler, a shot of liquor, or a mixed drink with

liquor in it," but did not include instances of only a sip or two being taken. The same 30 day

period applies to this variable.

Self-reported marijuana use (range 0-30, mean .7842, s.d. 3.93) asked specifically about

the respondents' number of days using or smoking "joints," "pipes," or "hash oil" in the 30 days

prior to and including date of survey administration. Within the overall sample, use of "blunts"

was a separate measure and is not included in the present analyses. It is highly likely that use of

blunts is also captured in a more general use of marijuana item.

Of the 16,001 respondents in the present sample, 11,291 (70.6%) reported never using

tobacco in any form, 9,455 (59.1%) reported no lifetime use of alcohol and 13,214 (82.0%)

reported no previous use of marijuana.

Independent Variables

All independent variables are measured by asking a series of questions which refer to the

12 months prior to and including the day of the survey administration. These variables were

coded dichotomous within the original survey, but are recoded for the present study so that 0

represented a "no" response and 1 represented a "yes" response. Therefore, a score of 1 to any of

the following indicates that the youth has had the experience within the 12 months prior to

survey administration. The noted percentages reflect the percent of the sample reporting an

affirmative response.

In school primary prevention programs: *Spec. Class* (45.7%) is attendance to a special

class about drugs or alcohol in school; *Film / Lect Class* (65.7%) is exposure to films, lectures,

discussions or printed information about drugs or alcohol in one of the youth's regular school

classes; and *Film / Lect Other* (41.1%) is exposure to films, lectures, discussions or printed

information outside of the youth's regular classes, such as in a special assembly.

TABLE 3: Independent Variables

	N = 16001		
Special Class in School about Substance Prevention:			
No:	n =	8685	54.3%
Yes:	n =	7316	45.7%
Film, Lecture, Discussion or Printed Material in a Regular Class:			
No:	n =	5491	34.3%
Yes:	n =	10510	65.7%
Film, Lecture, Discussion or Printed Material in Other (assembly, etc):			
No:	n =	9417	58.9%
Yes:	n =	6584	41.1%
Substance Prevention Program Outside of School:			
No:	n =	14213	88.8%
Yes:	n =	1788	11.2%
Message about Substance Prevention from a Source Outside School:			
No:	n =	3374	21.1%
Yes:	n =	12627	78.9%
Parent or Guardian Talk about Dangers of Alcohol / Drugs:			
No:	n =	6419	40.1%
Yes:	n =	9582	59.9%
Violence Prevention Program:			
No:	n =	13723	85.8%
Yes:	n =	2278	14.2%
Problem Solving, Communication Skills, Self-Esteem Group:			
No:	n =	12324	77.0%
Yes:	n =	3677	23.0%

Self-reported Exposure to or Participation in any of the above within
12 months prior to and including date of survey administration

The following independent variables are employed to differentiate participation in or

exposure to primary prevention programs outside of the school environment: *Sub Prev Out*

School (11.2%) is participation in a tobacco, alcohol or drug prevention program outside of

school; *Message Out* (78.9%) is having seen or heard any alcohol or drug prevention messages from sources outside of school, such as posters, pamphlets, radio or TV; and *Pt. Talk* (59.9%) indicates whether the youth has spoken with at least one parent or guardian in the last 12 months about the dangers of tobacco, alcohol or drug use.

The following variables may have occurred either in- or out- of school during the past 12 months: *Vio Prev* (14.2%) is participation in a violence prevention program, where the youth learns ways to avoid fights and control anger; and *Prob Solv* (23.0%) is participation in a problem-solving, communication skills or self-esteem group.

Control Variables

The following three variables, described previously in Table 1, were included in the regression equation as control variables: *Sex*, recoded so that 0 represented females and 1 represented males; *Race*, recoded into three dummy variables- *White, Black* and *RacOther*, with *white* left out of the equation as a reference variable; and *Age*, at the time of survey administration, coded continuously.

Methods

Three Multivariate Ordinary Least Squares (OLS) regression equations were modeled, using SPSS 17.0, with each of the dependent variables as a linear function of each of the foregoing independent and control variables such that:

Y_{DVpred} = a + b(*Spec Class*) + b(*Film / Lect Class*) + b(*Film / Lect Other*) + b(*Sub Prev Out School*) + b(*Message Out*) + b(*Pt. Talk*) + b(*Vio Prev*) + b(*Prob Solv*) + b(*Black*) + b(*RacOther*) + b(*Sex*) + b(*Age*) + e;

Where $Y_{DV\ pred}$ is the dependent variable predicted by the model (Model 1 predicts days of tobacco use, Model 2 predicts days of alcohol use and Model 3 predicts days of marijuana use); a is the intersect determined by SPSS; b is the coefficient determined by SPSS; (*X*) is each

independent variable; and *e* is the residual error. The null hypotheses will be rejected at the α =
.05 significance level.

Results

Tobacco

The results of Model 1, predicting days of tobacco use in the past 30 days, are presented
in Table 4. Model 1 is significant (F = 78.744, p = .000) and 95% Confidence Intervals[1] range
within approximately one-half day for the significant variables; therefore, the model does appear
useful. However, these predictors account for only 5.6% of the explained variance in tobacco use
over the past 30 days (R^2 = .056). Further, only one of the in-school predictors of substance use
is significant in this model in the direction hypothesized and is the least important significant
predictor, *Film / Lect Class* (b= -.519, p = .000). This indicates that, for this sample, students
exposed to an in-class film, lecture, discussion or printed material on substance prevention were
likely to use tobacco about one-half less day in the past 30 than students not similarly exposed.
There are eight significant predictors of tobacco use in the past 30 days in this model. In
descending order of influence for this sample they are: *Age* ,where a one year increase in age
accounts for increased tobacco use of .947 days; *Black*, where African American students report
decreased use of tobacco of 1.685 days over whites; *Race Other*, where other minorities report
decreased tobacco use of .966 days over whites; *Msg Out*, meaning that messages heard outside
of school result in a decreased tobacco use of 1.024 days; *Sex*, such that males use tobacco .621
more days than females; *Prob Solv*, where attending a problem solving group decreases tobacco
use by .667 days; *Vio Prev*, such that attending a violence prevention program increases tobacco
use by .727 days; and the previously discussed *Film / Lect Class*.

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[1] Confidence Levels are not reported for the models.

Table 4: Model 1
Past 30 Day Tobacco Use

Variable:	Unstd b	SE	Std b
Pt. Talk	- .066	.123	- .004
Prob Solv***	- .667	.151	- .037
Vio Prev***	.727	.186	.033
Sub Prev Out School	.276	.198	.011
Spec Class	.137	.133	.009
Film / Lect Class***	- .519	.142	- .032
Film / Lect Other	.097	.128	.006
Message Out***	-1.024	.148	- .055
Age***	.947	.036	.209
Black***	-1.685	.177	- .076
Rac Other***	- .966	.137	-.056
Sex***	.621	.117	.041

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a = -10.636*** se = .558 R^2 = .056

*p<.05   **p<.01   ***p<.001

a- intercept   se- standard error   Unstd b- unstandardized coefficient
Std b- standardized Beta

The null hypothesis can be rejected for this sample and it can be reported that attendance to school-based primary prevention programs for substance use reduces self-reported monthly tobacco use. However, given the difference of only one-half day per month less use, caution should be exercised when so reporting.

Alcohol

The results of Model 2, predicting days of alcohol use in the past 30 days, are presented in Table 5. Model 2 is significant (F = 60.661, p = .000) and 95% Confidence Intervals are

adequate for the model to be useful. Yet, again, these predictors account for little of the

explained variance (4.4%) in the model (R^2 = .044). Within this sample, no in-school efforts are

significant in predicting alcohol use in the past 30 days.

Table 5: Model 2
Alcohol Use Past 30 Days

Variable:	Unstd b	SE	Std b
Pt. Talk	- .074	.040	- .015
Prob Solv*	- .103	.049	- .018
Vio Prev	.052	.060	.007
Sub Prev Out School	.074	.064	.010
Spec Class	.020	.043	.004
Film / Lect Class	- .015	.046	- .003
Film / Lect Other	.042	.041	.008
Message Out*	- .108	.048	- .018
Age***	.293	.012	.201
Black***	- .401	.057	- .056
Rac Other*	- .108	.044	-.019
Sex	- .032	.038	-.007

a = - 3.406***, se = .180 R^2 = .044

*p<.05   **p<.01   ***p<.001

a- intercept   se- standard error   Unstd b- unstandardized coefficient
Std b- standardized Beta

In this sample, there are five independent variables that significantly influence reported

alcohol consumption for the month prior to survey administration. In descending order of

importance, these are: *Age*, every year increase of age predicts .293 additional days of alcohol

use; *Black*, where African Americans consume alcohol about one-half less (.401) days than

whites; *Rac Other*, minorities consume alcohol about .108 days less than whites; *Message Out*, hearing a message outside of school results in about .108 less days of alcohol consumption; *Prob Solv*, like tobacco use, attending a problem solving, self-esteem or communication skills groups decreases alcohol use, by about .103 days per month.

Here, the model is significant, but not for any in-school prevention programs, therefore the null hypothesis will not be rejected. In this sample, attending school-based primary prevention programs does not reduce self-reported monthly alcohol consumption.

Marijuana/Hashish

Model 3 predicts monthly marijuana use based on the independent variables. The results of the equation are reported in Table 6. The model is significant (F = 41.058, p = .000). The only in-school variable which is significant in this model, *Film / Lect Class*, captures .000 in its 95% Confidence Interval and is therefore not useful: Confidence Levels for all other significant variables are tightly aligned and the model appears useful else-wise. Again though, the ability of the included independent variables does little to explain the variance of marijuana use reported by respondents, reducing error when predicting monthly marijuana use by only 3.0% (R^2 = .030) within this sample.

Excluding *Film / Lect Class* for the reason noted above, there are five remaining significant predictors in this model, for this sample. In descending order of influence, they are: *Age*, a one year increase in age results in .380 more days of monthly marijuana use; *Message Out*, exposure to a substance prevention message outside of school decreases monthly marijuana use by just over one-third (.379) of a day; *Sex*, males smoke marijuana .258 days more than females; *Prob Solv*, attending a problem solving, communication or self-esteem group decreases marijuana use

by .252 days per month; *Black*, African Americans smoke marijuana on about a quarter day

(.249) less per month than whites.

Again, the null hypothesis cannot be rejected, given the results for this sample.

Attendance at school-based primary prevention programs does not reduce students' self-reported

monthly marijuana use.

Table 6: Model 3
Marijuana / Hashish Use Past 30 Days

Variable:	Unstd b	SE	Std b
Pt. Talk	.055	.064	.007
Prob Solv[**]	- .252	.079	- .027
Vio Prev	.156	.098	.014
Sub Prev Out School	.023	.104	.002
Spec Class	- .004	.070	.000
Film / Lect Class[*]	- .147	.074	- .018
Film / Lect Other	.116	.067	.015
Message Out[***]	- .379	.078	- .039
Age[***]	.380	.019	.162
Black[**]	- .249	.093	- .022
Rac Other	.026	.072	.003
Sex[***]	.258	.061	.033

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a = -4.550, se = .293 R^2 = .030

[*]$p<.05$ [**]$p<.01$ [***]$p<.001$

a- intercept   se- standard error   Unstd b- unstandardized coefficient
Std b- standardized Beta

Discussion

Although OLS regression techniques are notoriously sample specific and generalizations should be made with caution, the current study has several strengths uncommon in contemporary analyses based on secondary data. First, the sampling frame of the National Survey on Drug Use and Health is intentionally designed to be representative of all 50 states and the District of Columbia. Second, the survey items are developed with the primary goal of estimating quarterly and annual trends of substance use across the samples' population. Next, the variables identified within the current study are not proxies obtained from unlikely original measurement items: The independent variables herein are those to which the NSDUH specifically asks about attendance to programs and use of substances. Finally, the structure of the questions in the NSDUH allows for greater time-order sequencing which is one of the three criteria for determining causality. Attendance to prevention programs within the last 12 months, for the most part, will precede substance use in the past 30 days. Added to these strengths is that the current study was modeled with true ratio level data- self-reported substance use in a relatively easy to recall reporting period. Summed, these factors permit significant easing of restrictions in generalizing the results of this study.

With the foregoing in mind, the results are disappointing. In-school efforts to prevent the use of tobacco, alcohol and marijuana are severely deficient. The only significant finding for in-school prevention program success is in relation to the reduction of *tobacco* use by about one-half day per month through exposure to in-class prevention lectures, film, discussion or printed material. Primary substance prevention messages received outside the school environment were consistent in reducing use of all three substances examined herein, although to varying degree

and in small amounts. No model achieved greater than 5.6% ability to reduce the error of

predicting substance use, given these independent variables.

In order to assess whether the inclusion of control variables and out-of-school programs

into the models confounded the present results, an additional three models were estimated

(results not reported) using only the in-school items. These models achieved varying degrees of

significance, in sporadic directions for the predictors. However, R^2 results dropped to levels far

below any relevant usefulness in explaining the variance between self-reported substance use

levels: 0.4% for tobacco; 0.1% for alcohol; and 0.2% for marijuana. Such dismal proportionate

reduction in error results demonstrate that the models are incorrectly specified and the actual

reduction in use is attributable elsewhere. It appears the prevention message just isn't getting

through.

Three variables studied here are consistent, statistically, in predicting use across all three

substances, and have the effect of predicting decreased use by youth. Two of these, African

American race (*Black*) and attendance to a problem solving (*Prob Solv*), communication skills or

self-esteem group are also discussed elsewhere in the literature. There is evidence that suggests

that black youth are exposed to school-based prevention programs, including those with problem

solving curriculum, at higher levels than white youth since black youth are considered "at-risk"

(Hahn, et al., 2000). Within this sample, race was not a significant factor in attending problem

solving groups, as determined by a chi-square analysis (results not reported): 26.5% of blacks,

24% of minorities and 21.7 % of whites in the present study reported attending such a program.

Therefore, greater attendance by blacks in this sample to such programs does not create the

results found herein. One is left to consider the justification behind labeling blacks as "at-risk"

based solely on race.

The third variable consistent in predicting decreased substance use in the present study is exposure to prevention messages outside of the school environment. Future research should explore the channels of these messages and ages when these messages make the most impact. If messages are not getting through within the school setting, knowledge of when and how those received outside school impact youth can help redirect prevention efforts.

Within the school-environment, the most prominent candidate for inclusion in future studies is students' academic achievement and standing (Hopson and Steiker, 2008). This variable was not included in the present study, but may logically be associated with substance use. It is certainly feasible that students who are not achieving to potential or are experiencing other academic strains are more likely to use substances than those who are not, irrespective of prevention programming.

Some research has indicated substance use can be associated with other social influences as well (e.g. parents, peers, media) (Martino, Collins, Ellickson, Scheel, & Daniel, 2006; Scott, 1996) and personal concern or distorted knowledge of substance effects (Scott, 1996). While these potential correlates are beyond the scope of the current work, they should not be ignored as avenues in further research efforts.

Regardless the cause, it is clear that one decade after the implementation of the Principles of Effectiveness, schools are not meeting the goals set forth by the US Department of Education. This may not be surprising. Simons-Rudolph et. al. (2003) found that only 17% of school districts in their sample had plans for implementing all four Principles when surveyed one year after the effective date of the Principles. The least common Principle the districts had planned to implement was the requirement for research-based programs. Further, program evaluations thus far have focused on the youth's ability to identify drugs (Hahn, et al., 2000), on outcomes such

as attitudes about use, expectancies, social skills and self-esteem (Ennett, et al., 1994; Ringwalt, et al., 2009) and on facilitator effectiveness (Erhard, 1999; Scott, 1996).

Such outcome measures and efforts are not within the guidelines of success as defined by the US Department of Education (DOE, 1998; Simons-Rudolph, et al., 2003). The ramifications are clear: failure of the school districts to fully implement the Principles of Effectiveness (while still accepting the $650 million in annual appropriations for so doing) has left school-aged youth in a position of attending programs that do not diminish substance use. The costs are time away from what could otherwise have been valuable learning experiences and further waste of federal funds.

Limitations

Some caution is required when interpreting these findings relative to three variables: *Black, Sub Prev Out School* and *Vio Prev*. These three variables fall just under the 15% sample representation pertinent to OLS techniques. However, each remains close to 15% and they are included for control against the variables related to in-school programming. Future researchers may want to consider weighting responses for African Americans to give slightly more influence to their answers and specifically examine the effects of out-of-school substance and violence prevention programs on substance use.

None of the models in this study consider interactive or multiplicative effects of the variables. It is conceivable that attendance to a school-based primary prevention program for substance use interacts with the effects of an out-of-school program to achieve greater prevention from use. Given the small b coefficients and minimal effects of both in- and out- of school programs in the current study, it is unlikely any interaction is occurring or that the results are in danger from any such effect. Further, autocorrelation analysis for the error terms (Durbin-

Watson test) and tests for multi-collinearity do not appear to give rise to concern herein. Still, future research may want to attempt analyses for interactive or multiplicative effects.

There is some suggestion in previous research on primary prevention programs that youth may show lagged positive effects well into late adolescence, when the angst of teenage transitions has settled (Esbensen, Osgood, Taylor, Peterson, & Freng, 2001). Although it is more plausible that these lagged effects are a result of developmental and cognitive maturity, further investigation is warranted. Social scientists, in general, argue that true experimental design is unethical; however, employing randomization to prevention programs is the only way to achieve causal-certainty in any research results. Since primary prevention is fundamentally focused on everyone in a population, rather than those experiencing a specific problem (Esbensen, et al., 2001; Feldman, 2008), ethicality inheres in this particular instance. Investigators interested in this area are strongly encouraged to utilize experimental design in future assessment efforts.

Finally, the present study analyzed data for one year of a multi-year cross-sectional survey. There exists the possibility (although highly unlikely) that the year this study chose to examine exhibited a downward trend in the success of prevention programs due to extraordinary conditions. Since the NSDUH is a repeated cross-sectional survey based on probability sampling, data can be aggregated or compared from year to year (Menard, 2002). Therefore, future research can examine alternate years and responses to determine the overall impact of prevention programs[2].

Conclusions and Recommendations

The present study assessed the impact of the Principles of Effectiveness on primary substance prevention programs in America's schools. Primary prevention programs are general

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[2] SAMHSA encourages such cross-analysis, but cautions about changes in items, especially in the comparison of pre- and post- year 2002 (inclusive) survey administrations.

efforts to deter problematic behavior, in this case the use of tobacco, alcohol and marijuana. OLS

regression techniques were employed to examine a nationally representative sample of 16,001

youth aged 12 to 17. The results are dismaying: there is little empirical support that participation

in primary prevention programs impacts the use of tobacco, alcohol or marijuana across the

nation.

Current prevention efforts within the nation's schools should be reviewed for compliance

to the US Department of Education's Principles of Effectiveness. Where adherence is found

lacking, remedial efforts can be instituted to insure future compliance. If non-adherence is

determined to be due to negligence or unwillingness of districts to comply, or if remedial efforts

are not successful, these perpetual and limited taxpayer investments should be redirected to a

different greater good.

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